Linux Basics Tutorial

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for
Western PA Linux Users Group

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About this tutorial

Yet Another Linux Basics tutorial...
• RedHat does it in four 8 hour days, the compressed version is one 8 hour day
• Novell does it in 5 hours
• This is the attempt to teach you THE BASICS in 2.5 hours without corporate bias

This is a BETA.
If this is too slow or fast let me know!

What is Linux?

A Fully-Functional Multi-User Multi-Process Unix-like Open Source Operating System comprised of Linus Torvalds' kernel, many GNU tools, and software from many many more contributers worldwide
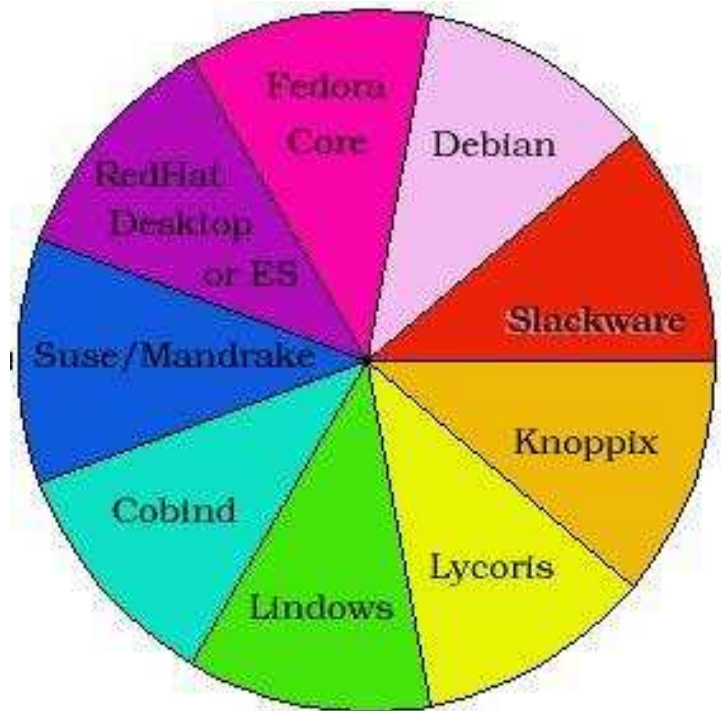
http://www.linux.org
http://www.kernel.org
http://www-2.cs.cmu.edu/~brians/comp/demon_penguin.html
http://web.mit.edu/jonas/www/faim/whatislinux.pdf

Wheel of Distros

Based on level of commitment to difficulty

Linux Rock

URL: http://info.linspire.com/LindowsRock/LindowsRock.html
The video requires shockwave

Grabbing your distro...

distrowatch.com Boasts that there are 304 Linux distros in their database

Retailers like amazon.com will sell Linux distros still in the box and books that include a copy of the author's favorite distro

Once you've made a choice you can download the ISOs or install floppies from the distributor's website or a mirror

Don't have a cdrw? cheapbytes Can help you out.

Burning ISOs – Linux in 2 steps

1) cdrecord -scanbus

2) cdrecord -v speed=2 dev=0,0,0 -data cdimage.iso

Copying cdrom

1) Mount /mnt/cdrom
2) mkisofs -r   -o cdimage.iso   /mnt/cdrom
3) cdrecord -v speed=2 dev=0,0,0 -data cdimage.iso

More than you ever wanted to know about Linux cd writing can be found at the howto...

http://www.ibiblio.org/pub/Linux/docs/HOWTO/CD-Writing-HOWTO

Windows ISO burning

http://www.deepburner.com/

Shameless plug...

LUGs are another great way to get started with Linux.

http://www.wplug.org

Installfests, General Users Meetings, Tutorials such as this, Mailing Lists, and more!

Books you should read

Linux Administration Handbook
by Evi Nemeth, Garth Snyder, Trent Hein, Trent R.
Hein

Linux Companion for System Administrators
second ed
Jochen Hein

RHCE Linux Exam Cram
second ed
Kara J. Pritchard

Good commands that you need to memorize, today!

File Commands: ls, cd, cp, mv, rm, mkdir, rmdir
text reading: cat, more, less
text tools: awk, grep, sed
text editors: vi, emacs, pico, gedit
time: date, cal, uptime

More commands...

Location: find, locate, which, whereis
file extraction: tar, unzip, gunzip
Processes: top, ps, lsof, kill, fg, bg
User tools: passwd, w, who, finger, talk
environment: printenv, setenv, echo

More commands...

Internet: lynx, pine, whois
Service control: chkconfig, init.d, service
Printing: lpr, lpq
Networking: ifconfig, route, traceroute, dig, ping

And some more commands

disk usage: du, df, quota
partitions: fdisk, fsck, mkfs, tune2fs, mount

Tell me something about my computer

uname -a
hostname
cat /proc/cpuinfo
cat /proc/meminfo
lspci
cat /proc/pci
lsmod

Init levels

Init allows you to control your system state

1 single user
2 multiuser
3 networking
4 reserved
5 X (aka the GUI)
6 reboot

init 3

Xfree86

/etc/X11/XF86Config

XFree86 -configure

Yup, we had a talk on this too!

http://www.wplug.org/meetings/one-meeting?wp_meeting_id=2987

Shutting down and Rebooting

/etc/shutdown -h now
/etc/poweroff
/etc/shutdown -t60 -r
/sbin/reboot

Output redirection

echo "this" > foo
echo "that" >> foo

cat foo
this
that

Pipes and More

The pipe |
cat /etc/passwd | grep

The semicolon ;
mkfs /dev/hdb1 ; mkfs /dev/hdb2

The slashdot ./
./myscript

Shell Scripting

A series of commands in an executable text file

```
echo "Hello World"
echo "Print this to File" >> foo
lpr -Pmyprinter foo
```

Getting Help

commands:man, info, {cmd} –help, apropos

Some distros have additional online documentation
in html form

The Linux filesystem

Formats: ext2, ext3

You can mount just about any kind of filesystem in
Linux

It all starts with /

/bin

/boot

/dev

/etc

/home

/lib

/mnt

/opt

/proc

/root

/sbin

/tmp

/usr

/var

Partitions

/boot
/usr
/opt
/home
/var
/tmp
<swap>
/

Files you never want to rm

- anything in /dev
- anything in /proc
- don't get tempted by /proc/kcore
- anything in /boot
- /lib/kernel/modules/{the kernel you want to use}
- contents of /etc, /bin, /usr/bin, /usr/lib
- you may remove the contents of /tmp but not /tmp itself!

Boot Loaders

LILO – a simple boot loader with no frills

GRUB – yet another boot loader with a very simple command line

lilo.conf example

```
boot=/dev/hda
map=/boot/map
install=/boot/boot.b
prompt
timeout=50
message=/boot/message
password=huggybot
lba32
default=linux
image=/boot/vmlinuz-2.0.36
    label=linux
    root=/dev/hda2
    read-only
other=/dev/hda1
    label=win
```

Set it into a action!

Run /sbin/lilo

writes to the MBR

/etc/grub.conf

```
# grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE:  You have a /boot partition.  This means that
#          all kernel and initrd paths are relative to /boot/, eg.
#          root (hd0,0)
#          kernel /vmlinuz-version ro root=/dev/hda5
#          initrd /initrd-version.img
#boot=/dev/hda
default=0
timeout=10
password=huggybot
splashimage=(hd0,0)/grub/splash.xpm.gz
title Red Hat Linux (2.4.20-31.9)
      root (hd0,0)
      kernel /vmlinuz-2.4.20-31.9 ro root=LABEL=/
      initrd /initrd-2.4.20-31.9.img
title Red Hat Linux (2.4.20-30.9)
      root (hd0,0)
      kernel /vmlinuz-2.4.20-30.9 ro root=LABEL=/
      initrd /initrd-2.4.20-30.9.img
```

Set it into action

If grub is already on your MBR, you need not re-install grub when you make changes to /etc/grub.conf

If you need to install grub on your MBR
/sbin/grub-install /dev/hda

Whole presentations can and have been done on GRUB

http://www.wplug.org/meetings/one-meeting?wp_meeting_id=3126

Kernels

Control how the operating system works!
Never before have we been allowed to get this close.

The Source: /usr/src/linux
Kernel boot images: /boot
All possible drivers: /lib/modules/kernel
All currently loaded modules: /sbin/lsmod

"uname -a" will tell you which kernel you are using
oldest recommended: 2.4.20
latest stable: 2.6.6

Want to compile your own?
http://www.kernel.conf

Installing software

Software you install often lands in /usr/bin
/usr/local/bin or /opt

Don't look in the "Start menu" because chances are,
it ain't there!!!

Installing Packages

Debian Packages - dpkg

Red Hat Packages – rpm
rpm -Uvh package.rpm
rpm -ivh package.rpm
rpm -aq | grep package
rpm -e package

Tar files

To extract a tar.gz file: tar -zxvf {filename}
To extract a .tar file: tar -xvf foo.tar
To create a .tar file: tar -cvf /foodir foo.tar

once you've extracted the tar file look for a readme.
Perhaps there's an executable installation file
Or a Makefile
Perhaps it's source you need to compile yourself

Security starts with you and your users!

Don't login as root, su instead.
No account or password sharing
logout or use xlock
Select GOOD passwords
Npasswd will help you pick good ones, respect it!
Protect your /etc/shadow

John the Ripper or crack will tell you if your
passwords are good enough!

You can implement kerbeos and secure cards.

File permissions

To check the permissions use "ls -l"
utilize groups

chown {username} {filename}
chown :{groupname} {filename}

chmod to change permissions
chmod a+rwx {filename}
chmod u+r {filename}
chmod o-x {filename}
chmod 700 {filename}

Start with a minimal configuration!

Don't install all the whistles and bells.
Only install what you need now.

Educate yourself about the services you are running!

No one should use telnet or ftp, use ssh/scp instead

Use chkconfig –list

check http://www.cert.org for vulnerabilities

turn off any services that are vulnerabilities until you can update or patch!

Update your packages!

Up2date from RHN is depreciated!
Use apt-get or yum instead
SUSE YOU – YAST Updater

Whole presentations on Linux security can and have been done

http://www.wplug.org/meetings/one-meeting?wp_meeting_id=3001

Get into trouble
Things you can try...

It won't boot!
Get out yout Knoppix CD

This process seems hung
ctrl+C or ctrl+Z, failing that try to kill it

See if you can jump to another a virtual console
ctrl+alt+f2

Desktop Usuage

Why pay $$$ for software when you could be using
http://www.openoffice.org
http://www.mozilla.org
http://www.gimp.org

Demo of Knoppix

We will take a look at Knoppix Linux which boots from any modern Intel-based PC with a cdrom without installing anything on your hard drive

Special Thanks

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Mark and Duncan

Huggybot